

Workshop on:

Ecosystem-Based Decision Support Tools for Fisheries Management

- Housekeeping Issues (hotel, meals, breaks...?)
- Introduction
- Participants (intros.)
- Objectives
- Background (NOAAs interest, pilots, etc.)
- Discussion of Our Approach and Cross cutting issues
- Agenda (proposed and changes?)
- Discussion of Proposed Products (meeting and beyond)
- Working Groups (rapporteurs)

Workshop on

Ecosystem-Based Decision Support Tools for Fisheries

Management

Objectives:

- (1) review the state-of-the-art in quantitative ecosystem-based decision support tools applied to fishery management (with links to EAM),
- (2) develop a comprehensive research agenda for advancing ecosystem approaches to fisheries (management)

NOAA's Strategic Goals

NOAA's Vision:

To move NOAA into the 21st century scientifically and operationally, in the same interrelated manner as the environment that we observe and forecast, while recognizing the link between our global economy and our planet's environment.



Ecosystems




Climate



**Weather and
Water**



**Transportation
and Commerce**



**Protect, restore, and manage the
use of coastal and ocean
resources through ecosystem-
based management**

NOAA Strategic Plan: FY05 - FY10

Mission: “Protect, Restore, and Manage the Use of Coastal and Ocean Resources through an Ecosystem Approach to Management”

Outcomes:

- “Healthy and productive coastal and marine ecosystems that benefit society.”
- “A well informed public that acts as a steward of coastal and marine ecosystems.”

Strategies:

- Engage and collaborate with our partners to achieve regional objectives, and implement cooperation strategies to improve regional ecosystem health.
- Manage uses of ecosystems by applying scientifically sound observations, assessments, and research findings to ensure the sustainable use of resources.
- Improve resource management by advancing our understanding of ecosystems through better simulation and prediction models.
- Build and advance the capabilities of an ecological component of the NOAA global environmental observing system.
- Develop coordinated outreach and education efforts.
- Engage in technological and scientific exchange with our domestic and international partners.

NOAA's Description of Ecosystem Approach

Management that is adaptive, geographically specified, takes account of ecosystem knowledge and uncertainties, considers multiple external influences, and strives to balance diverse societal objectives.

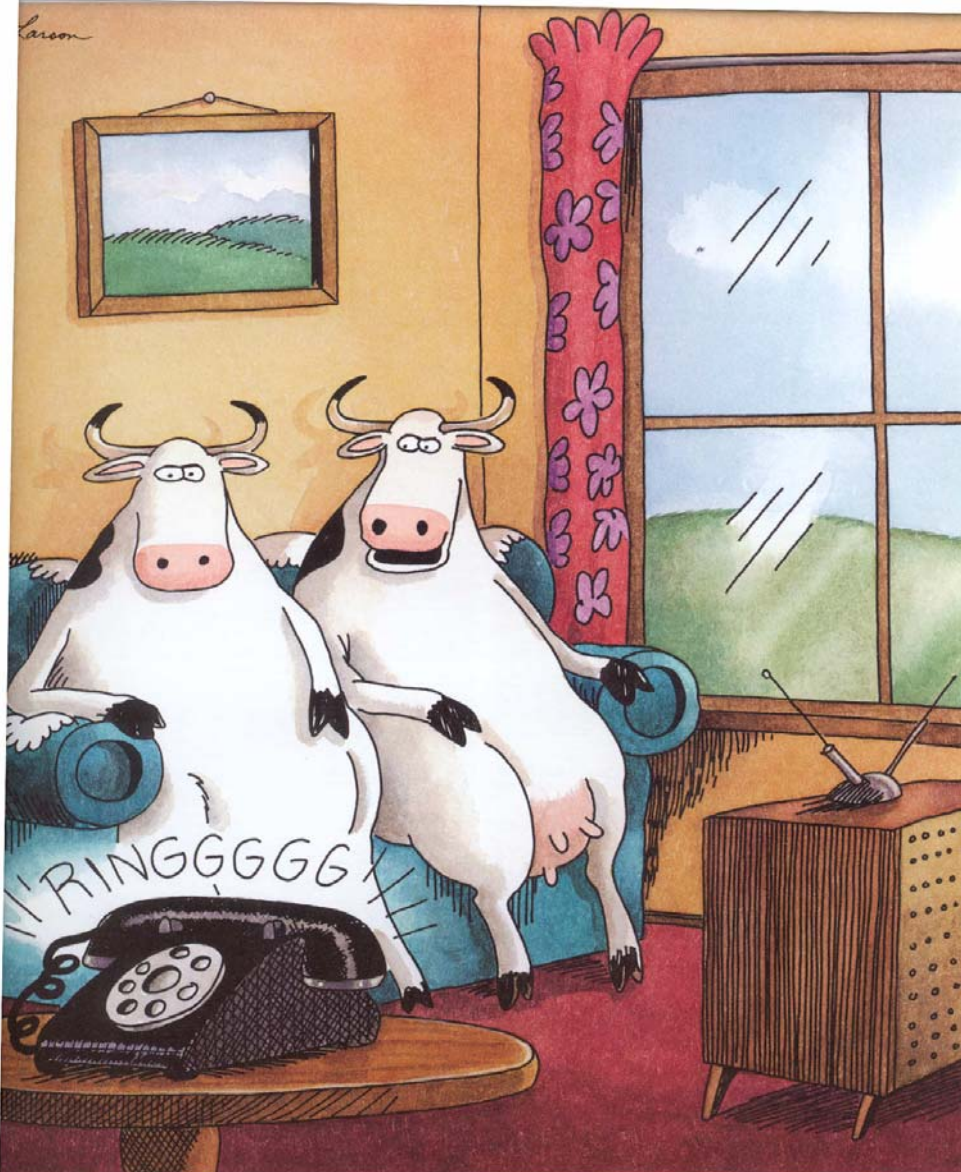
The transition to an ecosystem approach to management needs to be incremental and collaborative.



Characteristics of an ecosystem approach to management:

**it is adaptive (learning changes outcomes),
geographically specified (at scales appropriate to problems),
takes account of ecosystem knowledge and uncertainties
(including scientific observations and non-traditional sources
of information),
consider multiple external influences (human induced, & non-
human drivers), and
strives to balance diverse societal objectives (wide social
context for decision making).**

**The transition to an ecosystem approach to management
needs to be incremental and collaborative.**



Adaptive Approach to EAF, EAM



Well, there it goes again ... And
we just sit here without
opposable thumbs

What are the Main Issues relevant to Ecosystem Approaches to Fisheries (EAF)?

Bycatch or Fishery Interactions: Bycatch and fishery interactions including mortalities of non-target species that arise when multiple fisheries share the same species.

Indirect Effects of Harvesting: Indirect effects of harvesting through trophic interactions, and indirect effects through habitat-alteration, e.g. by fishing gear.

Interactions between Biological and Physical Components of Ecosystems: Trends in environmental variables (e.g. temperature, other oceanographic attributes) may result in long-term re-structuring of ecosystems

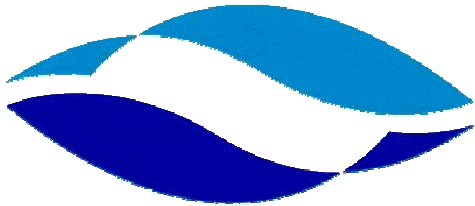
There are other management issues, however, FMCs do not have a sufficient authority to consider all critical issues affecting LMRs in regional ecosystems
(e.g., nutrients, toxics, coastal modifications, etc.)

Spatial management is usually considered a cornerstone of EAF

Ecosystem Pilot Projects Initiative: Update on Goals, Tasks, and Implementation

**NOAA-Fisheries Service:
S&T, NEFSC, NERO, SEFSC, SERO, HC
NOAA-NOS,**

**NEFMC, MAFMC,
SAFMC, GoMFMC**



Fisheries Ecosystem Pilot Projects

In FY04, Congress allocated ~\$2 million for NOAA-Fisheries to conduct ecosystem management pilot projects in four regions:

- ▶ New England
- ▶ Mid-Atlantic
- ▶ South Atlantic
- ▶ Gulf of Mexico



Report language from the Senate further explains -

“The pilots purposely cover bodies of water that are contiguous, because the one influences the others. “

“Ultimately, should the pilots prove successful, the Committee would expect to fold more specific initiatives into the larger ecosystem approach.”

“NMFS is directed to report to the Committees on Appropriations not later than December 1, 2003 on its plans for implementing the pilots.”

Spending Plan for Pilot Projects (FY-2004 - \$1.948 million)

Enhance Regional Ecosystem Governance Structures through Fishery Management Councils (FMCs)

- Determine Management Objectives, Threats, Options, and Alternatives – evaluate ability of Councils to expand their remit

Develop Quantitative Decision Support Tools

- Develop quantitative methods, frameworks and software to aid decision makers in evaluating management options and their consequences (models and GIS tools)

Conduct Technical Workshops

- Establish dialog between science and management in applying ecosystem principles to fisheries
 - * Assess the state-of-the-art, and facilitate dialog
 - * Determine technical needs

Fishery Management Council Projects

**NEW ENGLAND
FISHERY MANAGEMENT COUNCIL**



**Gulf of Mexico Fishery
Management Council**



Goals & Tasks:

- Conduct public meetings with stakeholder groups to identify and prioritize ecosystem-related issues
- Participate in coordinated opinions/attitudes survey with wider public input – identify issues where current authority insufficient
- Identify technical needs & inventory existing regional Information (including that held by NOAA)
- Synthesize public input on Ecosystem Goals and Objectives

Ecosystem Governance by FMCs

- Grants to Four Atlantic Fishery Management Councils (NE, MA, SA, GoM - \$225 k each)
- Evolving perspectives on ecosystem requirements (just as with single species approaches to management)
- Purpose is to engage Councils and their constituencies in public debate on goal setting, types of considerations to be included in EAF, and what issues are not covered under existing authorities (e.g, where other regional Governance Institutions must coordinate)
- Some Councils further along than others (e.g., **South Atlantic Council**), so One Size Does Not Fit All
- All Four Councils responded with proposals, All grants have been awarded
- All four Councils have now established Ecosystem Committees



Developing Decision Support Tools

Projects Funded for FY-04

Competitive RFP – 23 projects proposed, some w/university cooperators

- A Spatially-Explicit Ecosystem Model to Examine the Effects of Fisheries Management (Phil Levin et al. NW Center, U Washington, CSIRO-Australia)
- Ecosystem-Based Decision Support Toolbox (Mike Fogarty et al. NE Center)
- Development of Quantitative Performance Indicators for Ecosystem Management (Josh Nowlis et al. SE Center)
- Ecosystem Attributes and Adaptive Approaches During Stock Rebuilding (Mark Mangel et al, SW Center & UC-Santa Cruz)
- Analytical Framework Development for EFH (Mary Yoklavich SW Center, NW Region)
- Critical Evaluation of Ecopath and Ecosim Modeling Approaches (Chris Harvey et al, NW Center U Washington, U British Columbia)

GIS Applications in Support of Ecosystem Approaches to Fisheries Management (EcoGIS)

Goal is to develop analytic capabilities of advanced GIS to support Ecosystem Approaches (e.g., more than just drawing maps) – not necessarily just to provide specific applications for use by Councils

Two Types of GIS Products to be developed:

- Management-Level Applications with graphical user interface and ability to quickly and easily summarize data layers
- Science-Level Tools, with imbedded modeling and optimization capabilities

Primary Developers are several units of **National Ocean Service**. Test data series and project oversight by provided by S&T, HC, NE, SE Centers ~ Workshop was first step

EcoGIS Workshop (continued)

- Two specific projects (NE, SA) to collect data sources and Coordinate project
- Some data (e.g., bathymetry, environmental data) need to be “mined” from existing NOAA and other government databases, biological data from states, NOAA-Fisheries and other sources
- Critical for Councils to identify the types of analyses they need (e.g., predator-prey overlap, habitat type-trawling frequency, etc.)
- Full time staff at NOS devoted to the project (2 years), and Additional data sets and some staff at NEFSC and SEFSC. Some Councils have GIS capabilities
- Training is a need for scientists, staffs, decision makers
- Website with EcoGIS report is live

Ecosystem Pilot Projects ~ Next Steps

- **Social Science Survey Instrument Workshop**
(Nov 29-Dec 2, 2004 Miami, FL)
 - Kristy Wallmo, Rita Curtis chairs
- **Decision Support Tool Workshop**
(February 14-18, 2005 Key Largo)
 - Primarily a science needs assessment to support EAF
 - What constitutes an Integrated Ecosystem Assessment?

Delineation of Regional Ecosystems

- **August 31- Sept 1 Workshop in Charleston, SC**
- **Co-chaired by Paul Sandifer (USCOP) and Doug DeMaster (Ecosystem Goal)**
- **Key Federal Agencies (e.g. EPA, FWS, USGS, FS, NRCS, COE, Navy, MMS, etc.)**
- **Academics and NGOs, (e.g., Heinz, USCOP, South Atlantic/ Caribbean and Western Pacific FMCs, Atlantic Inter. Comm., TNC, etc.)**
- **States (SC, MS, MN, AK, HI)**

10 Ecosystems based on LMEs

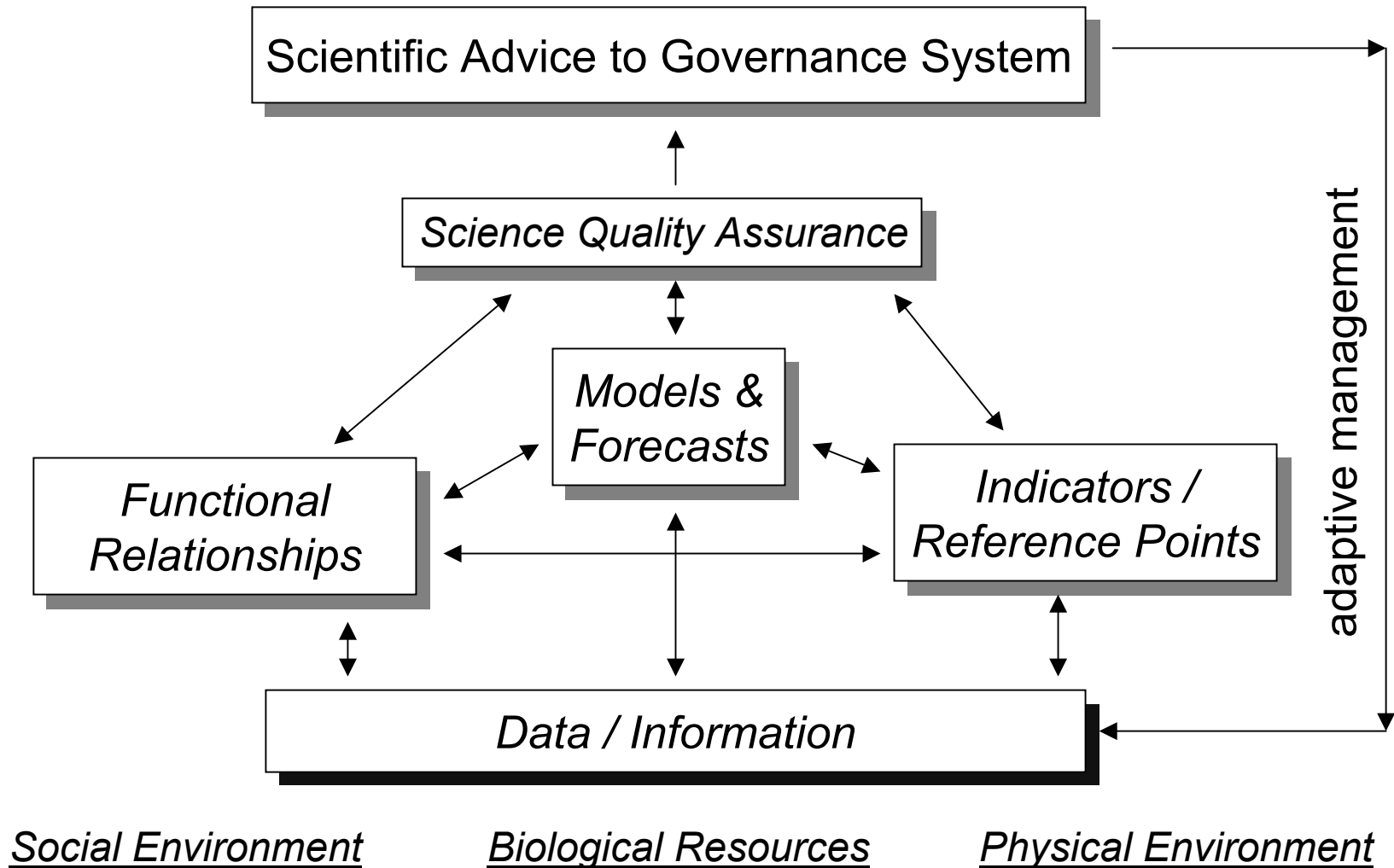
Regional Ecosystems of the United States



How to Organize Our Discussion on Ecosystem DSTs? (flow diagram approach)

- Data / Information (social, biological and physical)
- Indicators / Reference Points
- Functional Relationships among system components
- Models and forecasts
- Interactions between scientific advice and the governance system (including adaptive feedback between science and management)

Decision Tools Supporting Ecosystem Approaches to Fisheries



Cross-Cutting Issues:

What spatial/temporal, taxonomic scales necessary for EAF?

- How do definitions of regional ecosystems relate to information and modeling issues to support EAF? – boundaries are leaky
- What are appropriate quantitative assessments for management measures evaluation in an EAF context (models, indicators, data, functional relationships)?
- What science-governance relationships are applicable to differing data models (e.g., data rich, data poor)? How does the precautionary approach fit in such a scheme? Qualitative approaches, standard set of tools & approaches, avoid false dichotomies, maleable tools, risk assessments, objectives for EAF-M
- How do we forge links between EAF and EAM, given scientific uncertainty in linkages between fishery resources and broader ecosystem processes and management institutions?

Science Policy development & management of science

Tradeoffs – framework to make and science to assess, currencies that transcend Cumulative impacts accounting for goods and services (science needs), multiple currencies in decision making, utility theory, kilowats, emergy, jobs, cross-sectoral, within fisheries – between fisheries & other sectors, circular debate on science & management of ecosystems

Overview of Agenda:

Monday: background, agenda, discussion of governance, indicators

Tuesday: Functional Relationships, Models

Wednesday: Data-Information, Council Needs, Social Science Needs

Thursday: Continue discussions (as needed), Working Groups

Friday: Plenary, Report from WGs, Recommendations

February 14 (Monday)

0830-0930 – Welcome, introductions, housekeeping, and discussion on workshop content and products, assignment of rapporteurs, etc.

facilitating discussion: Steve Murawski

0930-1000 – Discussion of cross-cutting issues not included in topic sessions (*all*)

10:00-10:30 coffee

10:30-1200 - Ecosystem Science Advice in the context of Ecosystem Governance

facilitating discussion: [Andy Rosenberg](#), [Tony Smith](#)

1200: 1330 – Lunch

1330-1400 – continue discussion of governance focusing particularly on case histories, given different data models

1400 – 1430 Indicators / Reference Points

facilitating discussion: [Jason Link](#)/[Marie-Joelle Rochet](#)/[Kerim Aydin](#)

1430-1500: refreshment break

1500-1700 further discussion on the use of indicators, dimensionality, relationship to species-based management, etc.



Ecosystem

Governance

Plan

Day II Ecosystem Decision Support Tools Workshop

Functional Relationships
Villy Christensen, Mike Fogarty

Models
Beth Fulton, Jeremy Collie

Continuum

↓
Indicators
Functional Relations
Models
Forecasts

February 15 (Tuesday)

0900 1000 – Functional Relationships between Ecosystem Components- the bridge between data and models

*facilitating discussions: **Villy Christensen, Mike Fogarty***

10:00-10:30 coffee

10:30-1200: **continued discussion regarding functional relationships**

1200: 1330 – Lunch

1330 –1700 - The use of Models to Advise Ecosystem Approaches to Management

*facilitating discussions: **Beth Fulton, Jeremy Collie***

February 16 (Wednesday)

0900 Data/Information Requirements supporting EAF

*facilitating discussions: **Pat Sullivan, Fred Serchuk (Steve M. or volunteer)***

1000-1030: coffee

1030-1200: discussion of specific fishery management council needs as case histories, New England, Mid-Atlantic, Gulf of Mexico, South Atlantic

*facilitating discussions: **Chad Demarest, Tom Hoff, Bob Shipp, Steve Atran, Myra Brouwer & Vishwanie Maharaj***

1330 Social Science Data & Analytical Needs - a fusion of technical presentations & discussion

NMFS Social Science Program, **Rita Curtis**

Assessing stakeholder attitudes toward ecosystem management: a collaborative approach,
Kristy Wallmo

Ecosystem Management: Facts, fiction, or fantasy and something about menhaden, Jim Kirkley

Linking recreational and commercial benefits to ecosystem changes, Doug Lipton

Decision Models and Ecosystem Management, David Tomberlin

A general equilibrium ecology/economy model applied to an Alaskan marine system: John
Tschirhart

February 17 (Thursday)

0900 Continue discussions as appropriate from previous days

remainder of day: Task Teams meet to finalize discussions, prepare written summary from rapporteur's notes, and prepare short plenary discussion based on findings/highlights

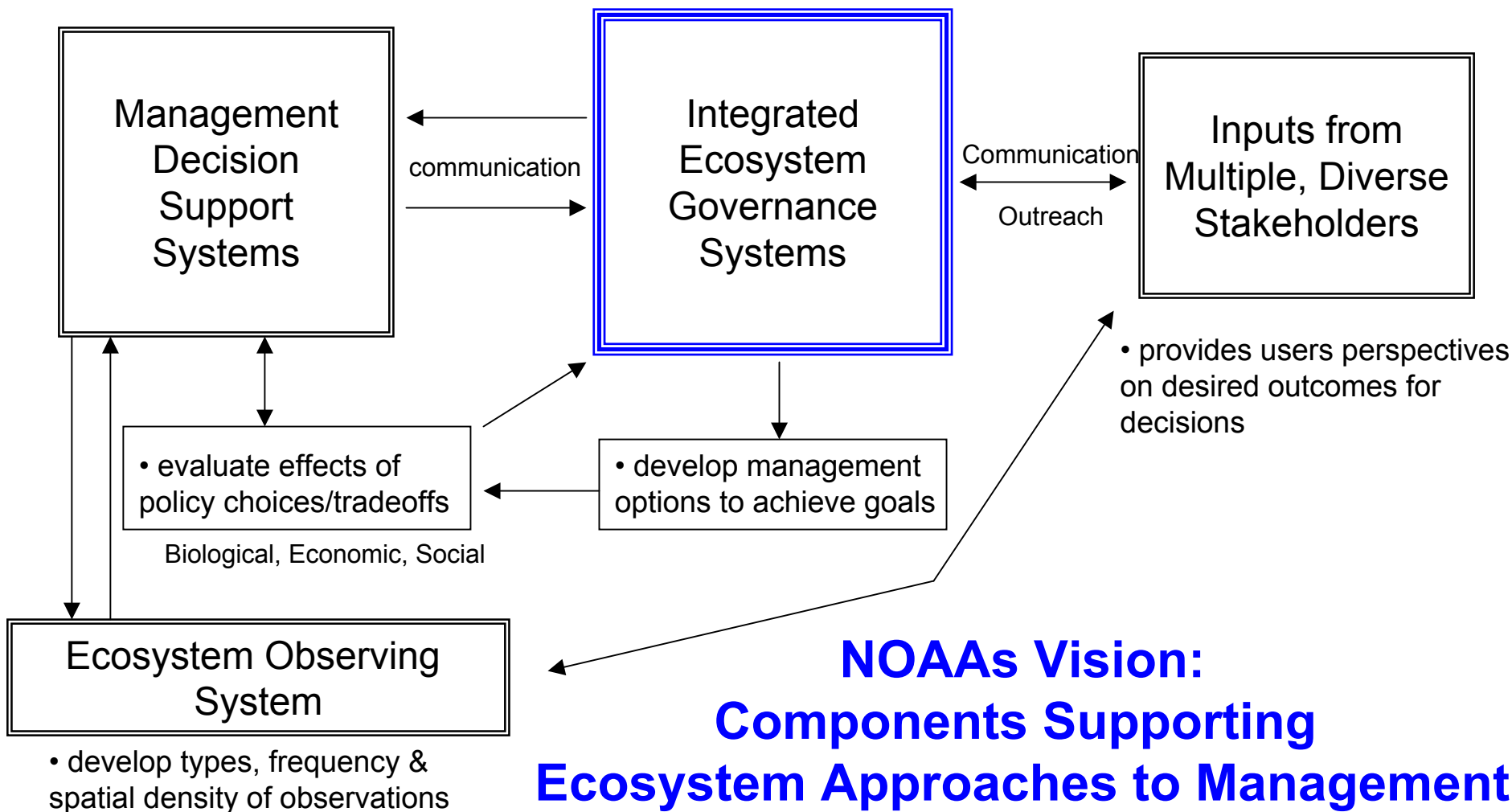
the write-ups will form the basis of the document, plenary discussions will highlight significant consensus and recommendations

February 18 (Friday)

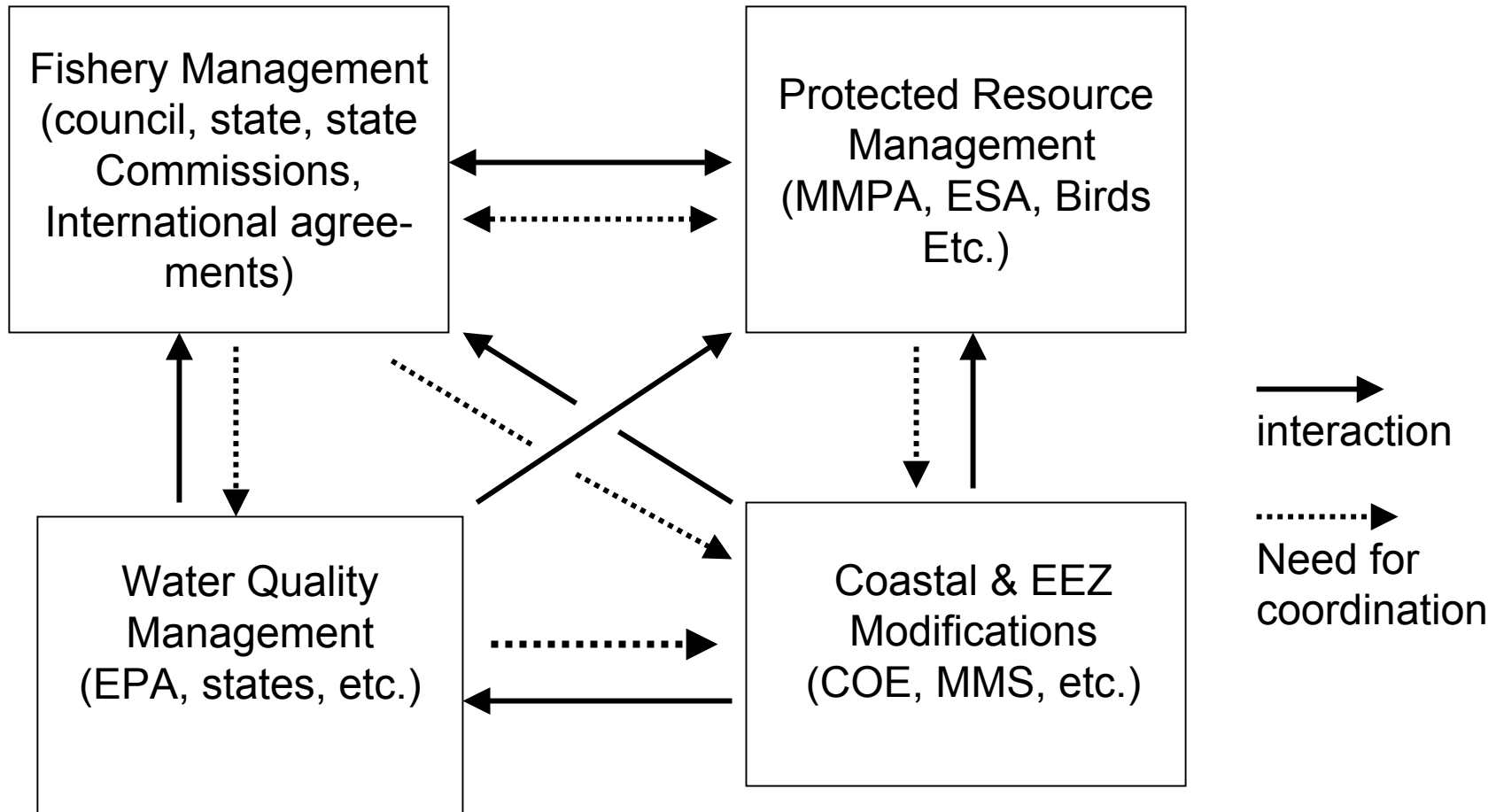
0830 – 1200 Plenary discussion of sections and finalize recommendations re. science needs

- synthesizes observations
- conducts process research to link dynamics between components
- develops status indicators for individual components & ecosystems

- provides forecasts of status & trends
- provides forum for resolving conflicting uses of ecosystems
- develops management measures to achieve strategic goals for species & ecosystems



Elements of Regional Ecosystem Governance



Other management authorities for navigation, food quality/safety, International agreements, climate change, etc.

